

have been torpedo trials, however, in which, by the combustion of rocket mixture and the direct application of the expanded gases in reaction, a fifty-mile rate of speed has been obtained. To obtain resistance force must be applied quickly, for the resistance increases in a marked ratio when compared with the pressure or speed of any object moving therein.

Water, though yielding a time enough be given—is not compressible, and when suddenly and powerfully pressed against resists like a wall of granite. Air, or more properly carbonic acid gas, is a permanent gas. It is elastic, and may be increased or diminished in volume by adding or withdrawing heat. But this, unlike steam, only within narrow limits, as no change of physical state, with enormous diminution in volume can occur.

The question arises at this point as to what effect is produced by the instantaneous application of this elastic, expansive gas at considerable pressure over surfaces of large area to this non-compressible, change resisting substance, water. The completeness and brevity of its application takes full advantage of the temporary immobility of water, and also in proportion to its brevity reduces the premature cooling effect. The laws of thermodynamics demand a cool substance for the reception of the next exhaust, but the cooling should be coincident with the conversion of heat into power. To precede it would cause a palpable loss. The question is, Does the cooling precede the application of the force, or is it simultaneous, and so in accordance with the laws of physics.

To ask the question in this form, having in view the attendant circumstances, virtually answers it; nevertheless, a slight loss undoubtedly exists, but practice and theory unite to show that it is but slight.

The propulsion by explosion is direct action, while the propulsion of a screw propeller is obliquely—a disadvantage from every point of view. Power is exerted in two directions on the screw to produce effect. One acts direct action, the other sideways. The ratio of power wasted increases with the pitch of the screw. Now, it is known that the screw propeller produces a vacuum astern which has been ascertained augments a vessel's resistance. The absence of a screw eliminates this retardation, and here is another point which will assist the system of propulsion by explosion. This vacuum which the forward motion of the vessel causes is filled by the gases of the discharges.

In the direct method of propulsion air is the working fluid, or the medium which receives heat and gives out kinetic energy. The vessel is forced forward in the water by the reaction or unbalanced pressure at the stern of the vessel of air suddenly expanded or exploded. This propulsion is pneumatic and not hydraulic, as no water is discharged. The action is somewhat similar to that of a skyrocket in air or to a submarine torpedo propelled by the expansion of rocket mixture. The object in this system has been to obtain propulsion directly from fuel, without the intervention of moving machinery, and by a single, simple, direct process.

The apparatus consists chiefly of a series of heavy steel cylinders placed longitudinally in the vessel, the ends of which may be opened by suitable gate valves, so as to be in direct communication with the external water. These cylinders contain no internal explosion, but are simply receptacles for atmospheric air and the fuel, which may be gaseous or liquid. The fuel, intimately mixed with the air and ignited by the electric spark, produces an instantaneous increase of pressure on the water astern of the vessel. Continuity of effort is obtained by having the discharge occur according to a predetermined rotation, so that, while one cylinder is recuperating, others are being discharged.

Reversal is effected by opening and closing gate valves at either end of the cylinders. There are in addition to these cylinders suitable apparatus for admitting and mixing the fuel and air, by which the small continuous process of producing water gas may be used instead of the liquid fuel. This is in brief a general outline of the method whereby propulsion is effected in the direct pneumatic system.

In the old trial of the vessel's mechanism a single cylinder was used, and electricity was generated by a dynamo worked by a steam engine. The vessel will now be worked by two cylinders and the electricity furnished by a stored battery.

The first thought is naturally that of a report connected with each explosion; the explosion occurring under water practically silences any report. It will be remembered that the explosion of the mines at Hell Gate produced little else than a rumble. Whether the detection of a vessel's approach could not be made known by establishing a means of conducting the sound from the water to an observer on the deck of a vessel is another matter. This, of course, would, in a measure, destroy the utility of the new system when applied to torpedo boats.

The machinery is so compact and at the same time so protected by being far below the water's surface that the eye of a naval officer is at once attracted to these advantages. There is apparently no opportunity to tamper with the mechanism unless it be to destroy one of the air pipes leading from the upper deck to the cylinders. This might be effected by a shell dropping on the between deck and fracturing the pipe. Yet this would be no injury unless the compartments in which the cylinders are situated should be full of water, in which case the air supply would be shut off.

French and American scientists have declared it impossible to propel a vessel by direct pneumatic propulsion, yet the vessel has moved and the chances of a speeded vessel appear to increase with each trial. The principles have succeeded. It remains to be seen what speed and power will be developed.—*New York Times*.

SCIENTIFIC AND USEFUL.

Finely ground glass, mixed with a small proportion of dried soda ash, makes a good polish for metals.

The results of the new French process of electrically engraving on glass are said to be of marvelous delicacy.

It is said that practical electricity is a subject to which the architect of the future will have to pay particular attention.

An electric hand-saw is the latest invention for carpenters. It works like any ordinary saw, the electricity being applied only in the process of setting and sharpening.

Aluminum for dental purposes is said to be coming into favor. It is pronounced better than rubber, being bright, strong, colorless and wholesome, and less costly than gold.

"Speryllite," a new discovery, is said to be the first mineral yet found containing platinum as an important constituent other than the natural alloys with various metals of the platinum group.

A good imitation of frosted glass may be produced by applying to the glass a saturated solution of alum in water. It may be colored by the addition of aniline dyes. The coloring is not very permanent, however.

One of the Northwestern railroads runs ventilated trains heated by steam from the engine and illuminated by electricity from a dynamo in the baggage car. The sleeping cars have an incandescent burner in every section.

The strongest wood in the United States is the tamarack of Arkansas; the weakest is the West Indian birch; the most elastic is the tamarack; the best for fuel is the blowwood of

Texas; the hardest and toughest is the hickory, and the softest is the white pine.

The new pencils introduced by Faber for writing upon glass, porcelain and metals, in red, white and blue, are made by melting together four parts of spermaceti, three parts of tallow and two parts of wax, this mixture being colored with white lead, red lead, or Prussian blue, as desired. James A. Brashers, the eminent astronomer, who was one time a patternmaker in a Pittsburgh rolling-mill, is everywhere recognized as an authority on spectroscopy. From the observations and photographs taken in California during the recent solar eclipse he concludes that the inner corona of the sun is electrical instead of being the product of meteoric streams.

A French biologist is seeking a bacillus that will kill that of consumption, or a disease that can be inoculated without risk to the patient, and will give protection against consumption. He is confident of ultimate success, although his experiments with typhoid have seemed to hasten the progress of the disease he wishes to check.

A London physician is of opinion that a turpentine bath is good for rheumatism, gout, insomnia, laryngitis and bronchitis, and recommends the following method of preparing it: Make a saturated solution of six ounces of yellow soap and add to it three or four ounces of oil of turpentine. Shake well, and then put it into the bath, which should be filled with warm water. After fifteen minutes' immersion the patient should be put to bed.

Two French gentlemen are constructing a terrestrial globe for the exposition of 1889, on the scale of one-millimeter. It will be thirteen meters in diameter and forty meters in circumference, and a kilometer will be represented on it by a millimeter. Paris will occupy a space about a square centimeter. It is believed that the contemplation of this object, whose size is a measurable fraction of that of the earth, will help better than any other existing apparatus, to convey a realization of terrestrial magnitude and distances.

Amovement has been started in Norway for the dispatch in the summer of 1890 of an expedition to the North Pole, and it is proposed that the leadership shall be offered to Dr. Nansen. Those who are arranging the plans maintain that no other country could furnish such a crew of experienced and hardy men and Arctic travelers as Norway, and that a winter or two in the Arctic regions would affect these men very little. The intention is that an attempt shall be made to reach the Pole by way of Franz Josef Land, a route advocated by the most experienced Norwegian Arctic travelers as well as by many who have studied the problem.

The managers of the Pennsylvania Railroad have resolved to rebuild all its bridges of short-span in brick or stone instead of iron. It is argued that the weight of locomotives has increased so much in the last twenty years that bridges, which were built with a large margin of safety, are now dangerously tried by the trains passing over them, and the expense of inspection and repair of iron bridges represents a large interest on their cost. For these reasons the engineers on the road have decided that brick or stone arches, although much more expensive in the first instance than iron trusses, will be cheaper as well as safer in the end.

Says the *New York Medical Journal*: In an experimental observation of thirty-eight boys of all classes of society and of average health, who had been using tobacco for periods ranging from two months to two years, twenty-seven showed severe injury to the constitution and insufficient growth; thirty-two showed the existence of irregularity of the heart's action, disordered stomachs, coughs and a craving for alcohol; thirteen had intermittency of the pulse and one had consumption. After they had abandoned the use of tobacco, within six months one-half were free from all their former symptoms, and the remainder had recovered by the end of the year.

To-day's Advertisements.

THEATRE ROYAL
CITY HALL, HONGKONG.

Under the distinguished patronage of
H.E. Sir G. W. DES VŒUX, K.C.M.G.,
AND
LADY DES VŒUX.

THIS EVENING,
the 4th April, 1889.

AMY SHERWIN,
the distinguished PRIMA DONNA from COVENT GARDEN, HER MAJESTY'S CRISTAL PALACE, &c.

Assisted by her
ENGLISH OPERA COMPANY.

THIS EVENING, the 4th April,
GRAND MILITARY COMMAND NIGHT.
Under the distinguished Patronage and in the presence of
H.E. Major General EDWARDS, R.E.,
Commander-in-Chief.

Second and last Performance of the great success of the Season
"THE DAUGHTER OF THE REGIMENT,"
with the same strong Cast and Effects as on SATURDAY.

SATURDAY, the 6th April,
Gounod's Masterwork,
"F A U S T,"
in 4 Acts,
with full Band and Chorus, assisted by Messrs. GRACE, CROW, and GENTLEMEN of the Choral Society.

Box plan at Messrs. KELLY & WALSH'S, LD., where Seats can be secured in advance for any night of the Season.

Soldiers in uniform 50 cents to Back Seats, other Prices as usual.

Doors open at 8.30 to commence at 9 P.M.
HUGO GORLITZ,
Manager.

UNION LINE.
NOTICE TO CONSIGNEES.

FROM ANTWERP, LONDON AND SINGAPORE.

THE Steamship "LANCEROT,"
Captain Dalley, having arrived from the above Ports, Consignees of Cargo are hereby requested to send in their Bills of Lading to the Under-Signed for countersignature, and to take immediate delivery of their Goods from alongside.

The Steamer is berthed at Kowloon and Cargo impeding her discharge will be at once landed and stored at Consignee's risk and expense and no Fire Insurance will be effected.

All claims against the Steamer must be presented to the Under-Signed on or before the 10th instant or they will not be recognized.

RUSSELL & Co.,
Agents.

Hongkong, 4th April, 1889.

ST. JOHN LODGE
OF HONGKONG,
No. 618, S.C.

A MARK LODGE will be held in FREEMASONS' HALL, Zetland Street, on TUESDAY NEXT, the 8th instant, at 8.30 for 9 P.M. precisely. Visiting Brethren are cordially invited.

Hongkong, 4th April, 1889.

To-day's Advertisements.

STEAM TO YOKOHAMA, VIA NAGASAKI, AND KOBE.
(Passing through the INLAND SEA.)
THE P. & O. S. N. Co.'s Steamship

"ANCONA"
will leave for the above places on WEDNESDAY, the 10th April, at NOON.

E. L. WOODIN,
Superintendent.

Hongkong, 4th April, 1889.

NOTICE.
THE INTEREST AND RESPONSIBILITY OF Mr. JULES KEISER in our Firm ceased on the 28th February last.

CHIS. J. GAUFF & Co.
Hongkong, 4th April, 1889.

TO LET.
A T. Bonham Road, "RIEBA," a SIX ROOMED BUNGALOW with Tennis Court.

Possession from the 1st May, 1889.
For Particulars, apply to
SILVESTRE ARLEGUI & Co.,
25, Pottinger Street.

Hongkong, 4th April, 1889.

THE PUNJON AND SUNGHIE DUA SAMANTAN MINING COMPANY, LIMITED.

NOTICE is hereby given that an EXTRA-ORDINARY GENERAL MEETING of the PUNJON AND SUNGHIE DUA SAMANTAN MINING COMPANY, LIMITED, will be held at the Registered Office of the Company No. 9, Queen's Road Central, Hongkong, on FRIDAY, the 19th day of April instant, at 4.30 O'CLOCK, IN THE AFTERNOON, when the subjoined Resolution, which was passed at the Extraordinary General Meeting of the Company held on the 4th April instant, will be submitted for Confirmation as a Special Resolution.

RESOLUTION.
That the Capital of the Company be increased to the sum of \$600,000 legally current in the Colony of Hongkong by the creation of 20,000 New Shares of \$30 each. Subject to any direction to the contrary that may be given by the Meeting sanctioning the increase of Capital, all New Shares shall be offered to the Members registered on the day of the confirmation of the resolution in proportion to existing Shares held by them, and such offer shall be made by notice specifying the number of Shares to which the Member entitled and limiting a time within which the offer if not accepted will be deemed to be declined, and after the expiration of such time or, on the receipt of an intimation from the Member to whom such notice is given that he declines to accept the Shares offered, such Shares shall be dealt with by the Directors in their discretion.

Dated the 4th day of April, 1889.
By Order of the Board,
A. O'D. GOURDIN,
Secretary.

THE PUNJON AND SUNGHIE DUA SAMANTAN MINING COMPANY, LIMITED.

NOTICE is hereby given that if the above mentioned Resolution for the increase of the Capital of the Company be confirmed, the Share Register of the Company will be CLOSED from the 19th day of April to the 11th day of May next, both inclusive.

Dated the 4th day of April, 1889.
By Order of the Board,
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Secretary.

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Dated the 4th day of April, 1889.
By Order of the Board,
A. O'D. GOURDIN,
Secretary.

Masonic.

ZETLAND LODGE
No. 525.

A REGULAR MEETING of the above LODGE will be held in FREEMASONS' HALL, Zetland Street, on FRIDAY NEXT, the 5th April, at 8.30 for 9 P.M. precisely. Visiting Brethren are cordially invited.

Hongkong, 29th March, 1889.

To be Let.
TO LET.
No. 2, MORRISON HILL; entry at once.

Apply to
G. C. ANDERSON,
13, Praya Central.

Hongkong, 3rd April, 1889.

TO BE LET.
With Immediate Possession.

A WELL FURNISHED HOUSE in Caine Road, best location, containing 6 ROOMS with Servants' Quarters; Water and Gas laid on.

Apply to
A. LIEBARD,
No. 8, Queen's Road Central.

Hongkong, 2nd April, 1889.

TO LET.
ROOMS in "COLLEGE CHAMBERS."

Apply to
DAVID SASSOON, SONS & Co.
Hongkong, 12th December, 1888.

TO BE LET.
(WITH IMMEDIATE POSSESSION).

ONE LARGE GODOWN No. 23A, Praya Central under Victoria Hotel Premises.

Apply to
DORABJEE & HINGKEE.
Hongkong, 30th March, 1889.

TO LET.
WITH IMMEDIATE POSSESSION.

NOS. 1, 2 and 4, QUEEN'S GARDENS.

Apply to
G. C. ANDERSON,
13, Praya Central.

Hongkong, 14th March, 1889.

TO BE LET.
A FIRST-FLOOR FLAT (Furnished or Unfurnished) in Blue Buildings for 6 months, from May 1st.

Apply to
Messrs. HOLIDAY, WISE & Co.,
Ice House Lane.

Hongkong, 27th March, 1889.

TO LET.
A T. Peak, "LA HACIENDA," formerly occupied by Sir George Phillips.

Apply to
H. N. MODY,
Victoria Buildings.

Hongkong, 12th December, 1888.

Insurances.
THREE IMPORTANT FACTS
ABOUT THE
STANDARD LIFE OFFICE.

1.—HALF A MILLION STEERING per annum is being paid in Death claims year by year.

2.—THE FUNDS IN HAND amount to upwards of Six Million and Three-quarter pounds Sterling and have increased 30 per cent. in the last 15 years.

3.—THE LIVES who die are annually replaced by more than double the number of fresh carefully selected lives.

THE BORNEO COMPANY, LIMITED,
Agents, Hongkong.

NOTICE.
THE MAN ON INSURANCE COMPANY LIMITED.

CAPITAL SUBSCRIBED.....\$1,000,000
The above Company is prepared to accept MARINE RISKS at CURRENT RATES on GOODS, &c. Policies granted to all Parts of the world payable at any of its Agencies.

WOO LIN YUEN
Secretary.

HEAD OFFICE,
No. 2, QUEEN'S ROAD WEST.

Hongkong, 1st February, 1889.

GENERAL NOTICE.
THE ON TAI INSURANCE COMPANY, (LIMITED).

CAPITAL TAELS 600,000, } \$833,333.33
EQUAL TO } \$318,000.00
RESERVE FUND

BOARD OF DIRECTORS.
LEE SING, Esq. LO YUK MOON, Esq.
LOU TSO SHUN, Esq.

MANAGER—HO AMEL.

MARINE RISKS ON GOODS, &c., taken at CURRENT RATES on all parts of the world.

HEAD OFFICE, 8 & 9, PRAYA WEST.
Hongkong, 17th December, 1888.

Intimations.
NOTICE OF REMOVAL.

I HAVE this day REMOVED to my new premises at No. 25, CAME ROAD, next door to the Japanese Consulate.

A. HAHN,
Piano-tuner and Repairer.

Hongkong, 1st April, 1889.

KOWLOON HOTEL.
J. C. L. ROUGH.....MANAGER.

WINE and SPIRITS of the best quality, ENGLISH & AMERICAN BILLIARD TABLES, BOWLING ALLEYS, TENNIS LAWN.

Hongkong, 21st January, 1889.

TUITION IN FRENCH.
MELLE MAILLARD begs to intimate that she will give LESSONS in FRENCH, Grammatical, Conversational or Literary. Terms on Application at 3, West Terrace, Hongkong, 1st April, 1889.

Hongkong, 1st April, 1889.

Intimations.

THE HONGKONG LAND INVESTMENT AND AGENCY COMPANY, LIMITED.

SUBSCRIBED CAPITAL.....\$2,500,000.
PAID UP CAPITAL.....1,250,000.

BOARD OF DIRECTORS.
Hon. J. BELL-IRVING, Chairman.
Hon. C. P. CHATER, Vice-Chairman.
Mr. E. A. SOLOMON.
Mr. J. S. MOSES.
Mr. S. C. MICHAELSEN.
Mr. G. E. NICHOL.
Mr. LEE SING.
Mr. POON PONG.

BANKERS.
THE HONGKONG & SHANGHAI BANKING CORPORATION.

THE objects for which this Company is formed are to transact in the Colony of Hongkong and its dependencies the purchases and sales of Property, to advance monies on Mortgage, to undertake the Management and Agency of Estates

